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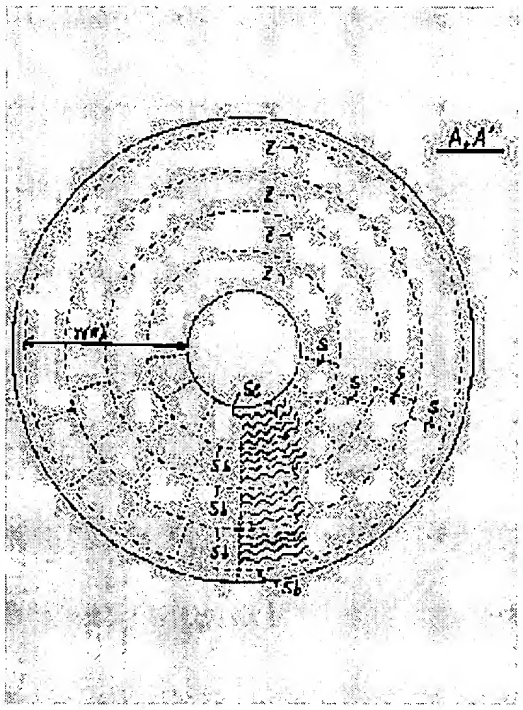
(54) OPTICAL DISK

(57)Abstract:

PROBLEM TO BE SOLVED: To reproduce the data without dividing into parts by displacing a groove in the direction of a groove width according to a specified displacement frequency and nearly fixing a groove width ranging a whole periphery excepting a zone boundary.

SOLUTION: Plural zones z are formed successively concentric circularly from an inner periphery toward an outer periphery in a recording area R having a radius r on an optical disk A, and this recording area R is divided concentric circularly by respective zones z. A wobble frequency minutely displacing (wobbling) all grooves in respective divided zones z in the radial direction is fixed. The wobbled groove width making a boundary Sb of each zone a start position of a start line Sc becomes the same phase in each zone z. Then, since this disk A is rotated always at the number of fixed disk revolution, the single wobble frequency decided at every zone z is increased stepwise in proportion to the radial direction according to that.



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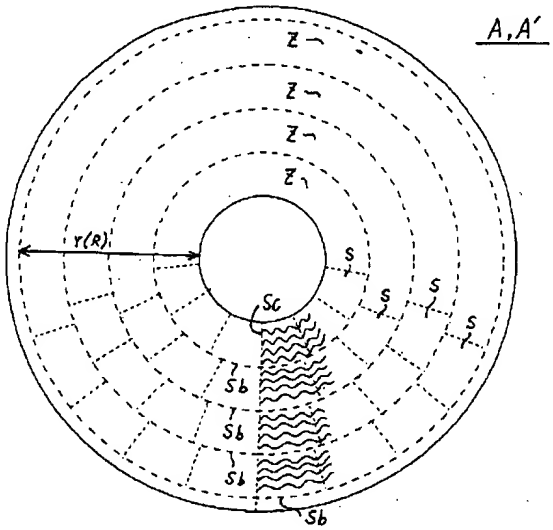
(54)【発明の名称】　光ディスク

(57)【要約】
【課題】　高速アクセスが可能でしかも高密度書換記録が可能なＤＶＤ－Ｒである光ディスクを提供する。
【解決手段】　グルーブ１を半径方向にゾーン分割してなるゾーンＣＡＶ方式あるいはゾーンＣＬＶ方式の光ディスクＡ．Ａ´であり、グルーブ１は、単一のウォブル周波数でグルーブ幅方向ａにウォブルされると共に、ゾーン境界ｓｂを除き、各ゾーンｚ内におけるグルーブ幅１ａ～１ｃ，…がディスクの全周にわたって略一定である。



* NOTICES *

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2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

CLAIMS

[Claim(s)]
[Claim 1] It is the optical disk with which it is characterized by groove width of face being abbreviation regularity over the perimeter except for a zone boundary while the variation rate of said groove is carried out crosswise [groove] according to a specific displacement frequency in the optical disk which has a spiral groove for reproducing the information which recorded information or was recorded, and comes to carry out zoning of this groove to radial.
[Claim 2] While the variation rate of said groove is carried out crosswise [groove] according to a specific displacement frequency in the optical disk which has a spiral groove for reproducing the information which recorded information or was recorded, groove width of face is the optical disk with which it is characterized by being abbreviation regularity over the perimeter.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]
[0001]
[Field of the Invention] This invention relates to the rewritable mold in which rapid access is possible, or a write-once (WO, ******) mold optical disk.
[0002]
[Description of the Prior Art] "DVD(digital videodisc)-R" further large-capacity-ized from current and the so-called "the CD(compact disk)-R (Recordable)" is going to be produced commercially. This DVD-R is WO media equipped with the memory capacity of one side 3.9GByte or 4.7GByte, and the CLV (Constant Linear Velocity) recording method is adopted like DVD only for playbacks. The double-sided disk which stuck the veneer disk with a thickness [with the same specification of DVD-R / as DVD only for playbacks] of 0.6mm, or one side can consider the single-sided disk of a dummy plate. 0.8 micrometers and the shortest pit length of a track pitch are 0.44 micrometers. The wavelength of the playback laser beam for reproducing the information which irradiated the wavelength and this continuation guide rail of a record laser beam for, irradiating the spiral continuation guide rail (a groove, ****) which forms the record section of DVD-R on the other hand, and recording information, and was recorded there is 635nm - 650nm, respectively.
[0003] By the way, there is the need of reducing the rotational frequency of the disk by the side of a periphery for a time rather than an inner circumference side (it illustrating to this drawing (A)) so that CLV may be a recording method which makes linear velocity regularity ranging from the inner circumference to a periphery of a disk as shown in drawing 14 (A) - (D) (it illustrates to this drawing (B)), for this reason it may be in inverse proportion to the record playback location in a groove. And a transfer rate and linear density need to be fixed ranging from the inner circumference to a periphery of a disk respectively (for it to illustrate to this drawing (C) and (D)).
[0004] Moreover, this DVD-R is minute displacement (wobble = wobble) to radial about a groove 1 at a fixed frequency so that fixed linear density may be obtained ranging from the inner circumference to a periphery of a disk. CLV record playback is enabled by controlling the rotational frequency of a disk by forming so that this reproduced wobble frequency (single carrier frequency) always becomes fixed. ** wobbling is performed for the anti-copying of a disk.
[0005] Thus, the above mentioned wobble condition in DVD-R As the value of one period of the wobble formed in each groove 1 serves as size from the inner circumference of a disk gradually in proportion to going to a periphery and it is shown in drawing 17 consequently Since each groove 1 will be in the condition of carrying out the wobble to radial at random, the groove width of face 1a-1c and -- are not fixed, and land widths 2a-2d and -- also become less fixed [--].
[0006]
[Problem(s) to be Solved by the Invention] There are the following technical problems in the above mentioned DVD-R. That is, DVD-R of CLV needs to adjust the engine speed of a disk minutely according to a radial data-logging location, and to always control linear velocity and a wobble frequency uniformly at the time of the use. For this reason, while the high density record with a fixed transfer rate

and linear density was possible for DVD-R of CLV at the time of record of data, at the time of playback (at the time [Especially] of seeking), by the time it reached the predetermined rotational frequency of the disk which becomes settled uniquely corresponding to the sought previous location, it required time amount, and there was a technical problem that rapid access became difficult in it.
[0007] Then, this invention is made in order to solve this paying attention to the above mentioned technical problem, and it offers the optical disk of (1) - (4) which carries out the following.
[0008] (1) As shown in drawing 1 , divide data storage area R ranging from the inner circumference to a periphery of a disk into many zones z in the shape of a concentric circle, and offer WO or the rewriting mold optical disk of structure which set constant the wobble frequency of the wobble which carries out minute displacement crosswise [groove / a] except for each zone boundary section sb.
[0009] (2) Moreover, it is ZCAV (Zoned Constant AngularVelocity, Zone CAV) about the optical disk of such structure. It provides as the optical disk (it had the property illustrated to drawing 15) of a method, or an optical disk (it had the property illustrated to drawing 16) of a ZCLV (Zoned Constant Linear Velocity, Zone CLV) method.
[0010] (3) Furthermore, this invention offers WO or the rewriting mold optical disk of structure which set constant the groove width of face 1a-1c covering the perimeter, and --, without dividing the record section R of data into many zones z in the shape of a concentric circle.
[0011] (4) Offer the optical disk of such structure as the optical disk of CLV, or an optical disk of CAV further again.
[0012]
[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention offers the optical disk which becomes the configuration of following (1) and (2).
[0013] (1) It has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded, as shown in drawing 1 - drawing 3 . In optical disk A.A' to which it comes to carry out zoning of this groove 1 to radial (ZCAV or ZCLV method) said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) The optical disk with which the groove width of face 1a-1c and -- are characterized by what is been abbreviation regularity (the groove width of face 1a-1c by which the wobble was carried out into each zone z, and the phase of -- are the same) over the perimeter of a disk except for the zone boundary sb.
[0014] In the optical disk which has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded (2) Said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) The groove width of face 1a-1c, the optical disk with which -- is characterized by what is been abbreviation regularity (the groove width of face 1a-1c by which the wobble was carried out in the record section R, and the phase of -- are the same) over the perimeter (the record section R of a disk) of a disk.
[0015]
[The mode of implementation of invention] Hereafter, the optical disk of this invention is explained using drawing 1 - drawing 13 , drawing 14 - drawing 16 . An enlarged drawing for drawing for drawing 1 to explain the whole optical disk structure of this invention and drawing 2 to explain the structure of the optical disk of this invention, Drawing for drawing 3 to explain the groove land condition in the optical disk of this invention by which wobbling was carried out, Drawing for drawing 4 to explain the groove land condition in the zone boundary of the optical disk of this invention, many properties (a disk rotational frequency --) in the optical disk of a ZCAV method with common drawing 5 Drawing for explaining linear velocity, a transfer rate, and linear density, drawing 6 , drawing showing the 1st and 2nd example of the motor control block with which drawing 12 drives the optical disk of this invention, respectively, Drawing 7 , drawing showing the 1st and 2nd example of the motor control block with which drawing 13 drives the optical disk of this invention, respectively, many properties (a disk rotational frequency --) in the optical disk of a ZCLV method with common drawing 8 Drawing for drawing for explaining linear velocity, a transfer rate, and linear density and drawing 9 to explain the

groove land condition in the optical disk of general CLV by which wobbling was carried out, Drawing for drawing 10 to explain the wobble signal amplitude which played the optical disk of the general CLV equipped with the groove land by which wobbling was carried out, Drawing for drawing 11 to explain the wobble signal amplitude which played the optical disk of this invention, many properties (a disk rotational frequency --) in the optical disk of CLV with common drawing 14 many properties [in / in drawing for explaining linear velocity, a transfer rate, and linear density, and drawing 15 / the optical disk of this invention of a ZCAV method] (a wobble frequency --) Drawing for explaining a disk engine speed and drawing 16 are drawings for explaining many properties (a wobble frequency, disk engine speed) in the optical disk of this invention of a ZCLV method.

[0016] As the optical disk of this invention is used for DVD-R which is WO media mentioned above and is shown in drawing 1 , sequential formation of two or more zones z is carried out toward the periphery at the shape of a concentric circle from inner circumference into the record section R which has a radius r (the example of this drawing four zones z), and this record section R is divided by each zone z in the shape of a concentric circle (the so-called zoning). Each zone z is divided into a circumferencial direction by further two or more sectors s. The wobble frequency which carries out the minute variation rate (wobble) of all the grooves 1 in each zone z by which zoning was carried out to radial presupposes that it is fixed.

[0017] That is, as the optical disk of this invention is shown in drawing 2 , the groove width of face 1a-1c of a groove 1 and -- are the same dimensions (as shown in drawing 3 , it is groove width-of-face 1a= groove width-of-face 1b= groove width-of-face 1c--), and the land widths 2a-2d of a land 2 and -- are also the same dimensions (as shown in drawing 3 , it is land-width 2a= land-width 2b= land-width 2c= land-width [of 2d] --). In this way, as shown in drawing 1 , the groove width of face 1a-1c and -- which make a starting position the initiation line sc of each zone boundary sb and by which the wobble was carried out become in phase in each zone z.

[0018] Moreover, as shown in drawing 2 , on the land 2, the address which shows the whereabouts of record data forms PURIPITTO, and is recorded beforehand. Data are recorded on the groove 1 relevant to land pit 2p to which this address was given.

[0019] As described above, the addressing structure formed of the groove 1 and land pit 2p by which the wobble was carried out For example, when the track pitches (groove width-of-face + land width) of a groove 1 are 0.8 micrometers and the groove width of face 1a-1c and -- is 0.4 micrometers, The amount of displacement of the groove 1 by wobbling makes **40nm and a wobble frequency a single frequency, and the die length of the wobble configuration per period is made into 50-micrometer order, and it is formed so that it may become abbreviation regularity over the disk perimeter.

[0020] as the initiation line sc of said zone boundary sb carried out shows drawing 4 , optical disk A rotates one time -- ** -- in order to form so that it may be alike and may appear once , optical disk A rotates one time -- ** -- it is perform that it is alike and only a specific field part changes groove width of face and a land width (the field of a shadow area shows starting position 2AB and its termination location 2AA of the land 2 corresponding to one rotation of optical disk A among this drawing) .

[0021] That is, although it is groove width-of-face 1aa= groove width-of-face 1ab= groove width-of-face 1ac= groove width-of-face 1ad= groove width-of-face 1ae of a groove 1, it is land-width 2ab!= land-width 2ac. Moreover, although it is groove width-of-face 1ba= groove width-of-face 1bb= groove width-of-face 1bc= groove width-of-face 1bd= groove width-of-face 1be, it is land-width 2bc!= width-of-face 2bd.

[0022] By the way, the optical disk of this invention can consist of any methods of a ZCAV method and a ZCLV method. the following -- [-- ZCAV -- a method -- this invention -- an optical disk -- A --] -- [-- being general -- ZCAV -- a method -- an optical disk --] -- [-- ZCLV -- a method -- this invention -- an optical disk -- A -- ' --] -- [-- being general -- ZCLV -- a method -- an optical disk --] -- order -- explaining .

[0023] Optical disk A of this invention of a [optical disk [of this invention of a ZCAV method] A] ZCAV method is divided into many zones z in the shape of a concentric circle in the record section R from the inner circumference of a disk to a periphery, as shown in drawing 1 , drawing 15 (A), and (B).

The variation rate (wobbling) of the spiral groove 1 in each zone z is carried out crosswise [groove / a] by the single wobble frequency set to every zone z, consequently it is fixed over the perimeter. [of each groove width of face 1a-1c and --] And the rotation drive of this optical disk A is always carried out at a fixed disk engine speed, and the single wobble frequency set to every zone z presupposes that it increases stair-like in proportion to radial [of a disk] according to this.

[0024] The optical disk of a general ZCAV method to [optical disk [of this invention of a ZCAV method] A] which carried out the [optical disk of general ZCAV method] above is explained using drawing 5 (A) - (D). The groove width of face in each zone z to whose groove width of face in each zone z not being [the optical disk of a general ZCAV method] the same of optical disk A of a ZCAV method is the same over the perimeter, and only this is both difference.

[0025] The rotation drive of the optical disk of this general ZCAV method is always carried out at a fixed disk engine speed (it illustrates to this drawing (A)), consequently linear velocity increases gradually ranging from the inner circumference to a periphery of a disk (it illustrates to this drawing (B)). Moreover, a transfer rate carries out a sequential increment stair-like in proportion to a radial zone z location, and further, although linear density changes minutely in proportion to a location radial [in each zone z] (it illustrates to this drawing (C)), this minute variation becomes fixed in all the zones z (it illustrates to this drawing (D)).

[0026] [optical disk A' of a ZCLV method] -- on the other hand, optical disk A' of this invention of a ZCLV method is divided into many zones z in the shape of a concentric circle in the record section R from the inner circumference of a disk to a periphery, as shown in drawing 16 (A) and (B). The variation rate (wobbling) of the spiral groove 1 in each zone z is carried out crosswise [groove / a] by the single wobble frequency set to every zone z, consequently it is fixed over the perimeter. [of each groove width of face 1a-1c and --] And a rotation drive is carried out so that a fixed wobble frequency may always be obtained, for this reason this optical disk A' presupposes a rotational frequency that sequential reduction is carried out stair-like in inverse proportion to a radial zone z location.

[0027] The optical disk of a general ZCLV method to {optical disk A' of a ZCLV method} which carried out the [optical disk of general ZCLV method] above is explained using drawing 8 (A) - (D). The groove width of face in each zone z to whose groove width of face in each zone z not being [the optical disk of a general ZCLV method] the same of optical disk A' of a ZCLV method is the same over the perimeter, and only this is both difference.

[0028] The optical disk of this general ZCLV method is what carries out sequential reduction of the disk rotational frequency gradually in inverse proportion to a radial zone z location in order to always obtain a fixed linear velocity (it illustrates to this drawing (A)). Consequently, although linear velocity changes minutely in proportion to a location radial [in each zone z], this minute variation becomes fixed in all the zones z (it illustrates to this drawing (B)). Moreover, a transfer rate becomes fixed unrelated always in each zone z location (it illustrates to this drawing (C)), and further, although linear density changes minutely in inverse proportion to a location radial [in each zone z], this minute variation becomes fixed in all the zones z (it illustrates to this drawing (D)).

[0029] It things-******. now -- having mentioned above -- {-- ZCAV -- a method -- this invention -- an optical disk -- A --} -- {-- ZCLV -- a method -- this invention -- an optical disk -- A -- ' --} -- respectively -- a rotation drive -- carrying out -- The following, [a rotation drive of optical disk A of a ZCAV method], [data logging to optical disk A of a ZCAV method], [-- ZCAV -- a method -- an optical disk -- A -- from -- data -- playback --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- data logging --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- from -- data -- playback --] -- ** -- order -- explaining .

[0030] The motor control block 10 for carrying out the rotation drive of the optical disk A of a [rotation drive of optical disk A of ZCAV method] ZCAV method consists of 1-/N frequency divider 10a, servo circuit 10b, motor 10c, frequency generating circuit (FG)10d, and band pass filter (BPF) 10e, as shown in drawing 6 .

[0031] The motor control block 10 of a configuration of having described above operates as follows. That is, as shown in drawing 6 , after dividing of the clock Xtal outputted from the oscillator circuit

which is not illustrated is carried out to 1/N by 1-/N frequency divider 10a, it is outputted to servo circuit 10b as one input signal as a spindle reference signal. This spindle reference signal is a rotation reference signal for unrelated always obtaining a fixed disk rotational frequency in a zone z location radial [at the time of the recording head (pickup) which is not illustrated carrying out the record (playback) scan of the optical disk A top]. 10d of frequency generating circuits generates the signalling frequency according to rotation of the spindle of motor 10c, and they output this signalling frequency to servo circuit 10b as an input signal of another side. Servo circuit 10b compares the gap (difference) of signalling frequency to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.

[0032] In this way, the motor control block 10 can carry out the rotation drive of this optical disk A so that it may set always constant the engine speed of optical disk A laid in the turntable which is not illustrated.

[0033] It is recorded at the time of [data logging to optical disk A of ZCAV method] data logging, wobbling of the data being carried out to a groove 1 by the record laser beam irradiated ranging over the groove 1 of optical disk A, and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the recording head which is not illustrated. It can come, simultaneously incidence of the return light (reflected light from optical disk A) of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0034] This Push-Pull signal is outputted to the recording system which is not illustrated as a reference clock for record, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 10e. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result. As the above mentioned [rotation drive of optical disk A of a ZCAV method] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A is carried out so that the number of rotations of this optical disk A laid in a turntable may be set always constant. Therefore, the always stabilized ZCAV record is attained.

[0035] The data currently recorded by carrying out wobbling to a groove 1 by the playback laser beam irradiated ranging over the data-logging finishing groove 1 of optical disk A and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the pickup which is not illustrated are reproduced at the time of [data playback from optical disk [of a ZCAV method] A] data playback. It can come, simultaneously incidence of the return light (reflected light from optical disk A) of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0036] This Push-Pull signal is outputted to the reversion system which is not illustrated as a reference clock for playback, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 10e. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result. As the above mentioned [rotation drive of optical disk A of a ZCAV method] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A is carried out so that the number of rotations of this optical disk A laid in a turntable may be set always constant. Therefore, the always stabilized ZCAV playback is attained.

[0037] [-- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive --] -- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive -- carrying out -- a sake -- motor control -- a block -- 11 -- drawing 7 -- being shown -- as -- one -- /-- N -- a frequency divider -- 11 -- a -- a servo -- a circuit -- 11 -

- b -- a motor -- 11 -- c -- a band pass filter (BPF) -- 11 -- d -- one -- /-- N -- ' -- a frequency divider -- 11 -- e -- from -- constituting -- having .
[0038] The motor control block 11 of a configuration of having described above operates as follows. That is, as shown in drawing 7 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 11a, it is outputted to servo circuit 11b as one input signal as a spindle reference signal. the recording head (pickup) which does not illustrate this spindle reference signal -- optical disk A' -- it is a rotation reference signal for obtaining the disk rotational frequency which carries out sequential reduction stair-like in inverse proportion to a zone z location radial [at the time of carrying out the record (playback) scan of the top]. As an input signal of another side inputted into servo circuit 11b, the reference clock for record / playback pass Push-Pull signal band pass filter 11d and 1/N'frequency divider 11e is used so that it may mention later. Servo circuit 11b compares a gap (difference) of the reference clock to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.
[0039] In this way, the motor control block 11 can carry out the rotation drive of this optical disk A so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the record (playback) scan of the rotational frequency of optical disk A' laid in the turntable which is not illustrated].
[0040] [-- ZCLV -- a method -- an optical disk -- A -- ' -- data logging --] -- data logging -- the time -- not illustrating -- a recording head -- a laser light source -- from -- an optical disk -- A -- ' -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- record -- a laser beam -- a groove -- one -- data -- wobbling -- carrying out -- having -- while -- recording -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A') of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0041] This Push-Pull signal is outputted to 1/N'frequency divider 11e and the recording system which is not illustrated as a reference clock for record, respectively, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result.
[0042] Moreover, after dividing of the reference clock for record outputted to 1/N'frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.
[0043] As the above mentioned [rotation drive of optical disk A' of a ZCLV method] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the writing scan of the rotational frequency of this optical disk A' laid in a turntable]. Therefore, the always stabilized ZCLV record is attained.
[0044] [-- ZCLV -- a method -- an optical disk -- A -- ' -- from -- data -- playback --] -- data -- playback -- the time -- not illustrating -- pickup -- a laser light source -- from -- an optical disk -- A -- ' -- data logging -- finishing -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- playback -- a laser beam -- a groove -- one -- wobbling -- carrying out -- recording -- having -- **** -- data -- reproducing -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A') of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by

the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0045] This Push-Pull signal is outputted to the reversion system which is not illustrated as a reference clock for playback, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result.
[0046] Moreover, after dividing of the reference clock for playback outputted to 1/N'frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.
[0047] As the above mentioned [rotation drive of optical disk A' of a ZCLV method] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the playback scan of the rotational frequency of this optical disk A' laid in a turntable]. Therefore, the always stabilized ZCLV playback is attained.
[0048] By the way, it sets to playback of the optical disk of the general CLV equipped with many properties (a disk engine speed, linear velocity, a transfer rate, linear density) shown in drawing 14 . As shown in drawing 9 , the level of the wobble signal acquired from the return light (reflected light) of the playback laser beam irradiated ranging over the groove 1 on which data were recorded, and the lands 2 and 2 of the both ends of this groove 1 It was indispensable to have performed waveform shaping which there is a problem which varies as follows, removes dispersion in level in the reversion system using such a wobble signal, and is made into the wobble signal of fixed level.
[0049] That is, as shown in drawing 9 , the phase of the wobble signal wave form acquired based on the return light of the playback laser beam which scans the location AA of land-width 2ca!= width-of-face 2cb of a wobble does not correspond in the groove cross direction a. For this reason, the amplitude of the wobble signal wave form acquired in this way is level shown with a broken line like the wobble signal amplitude shown in the left-hand side in drawing 10 , and is a low comparatively.
[0050] On the other hand, as shown in drawing 9 , the phase of the wobble signal wave form acquired based on the return light of the playback laser beam which scans the location AB of land-width 2deca= width-of-face 2db which exists rarely of a wobble corresponds in the groove cross direction a. For this reason, the level higher than said level shown with a broken line like the wobble signal amplitude which shows the amplitude of the wobble signal wave form acquired in this way to the right-hand side in drawing 10 is obtained. Thus, the level of the wobble signal reproduced by the location to scan varies at the time of playback of the optical disk of general CLV.
[0051] by the way -- having mentioned above -- ZCAV -- a method -- depending -- this invention -- an optical disk -- A -- or -- ZCLV -- a method -- depending -- this invention -- an optical disk -- A -- ' -- playback -- setting -- As shown in drawing 3 and drawing 4 , the above mentioned zone boundary sb (starting position 2AB and its termination location 2AA of a land 2) is removed. Since the land width is uniformly formed over the perimeter of a disk so that the phase of a wobble may be made in agreement by radial It cannot be overemphasized that it becomes always fixed [the level of the wobble signal acquired based on the return light of the playback laser beam irradiated ranging over the groove 1 by which data logging was carried out, and the lands 2 and 2 of the both ends of this groove 1].
[0052] Consequently, this can be used in the reversion system using such a wobble signal, without performing waveform shaping which removes dispersion in level and is made into the wobble signal of fixed level.
[0053] That is, since all of the land width of the lands 2 and 2 of the both ends of a groove 1 are in agreement except for the zone boundary sb, the wobble signal of fixed level can always be acquired like the wobble signal amplitude shown in drawing 11 . in this way -- ZCAV -- a method -- depending -- this invention -- an optical disk -- A -- or -- ZCLV -- a method -- depending -- this invention -- an optical

disk -- A -- ' -- playback -- the time -- **** -- the amplitude -- a wobble signal with high fixed dependability can be acquired.

[0054] Now, although each optical disk [of this invention of the ZCAV method mentioned above or a ZCLV method] A and A' was an optical disk equipped with the zone boundary sb The optical disk A1 of this invention of the CAV explained below or CLV and A1' All of the groove width of face 1a-1c and -- are the optical disks of regularity (all also of land widths 2a-2d and -- are fixed) like optical disk A which all are the disks which are not equipped with the zone boundary sb, and described them above, and A'. CAV -- or -- CLV -- this invention -- an optical disk -- A -- one -- A -- one -- ' -- structure -- having mentioned above -- ZCAV -- a method -- or -- ZCLV -- a method -- an optical disk -- A -- A -- ' -- comparing -- a zone -- a boundary -- sb -- having -- **** -- a point -- being different -- only -- it is -- structures other than this -- being the same .

[0055] That is, each of optical disks A1 of this invention of CAV or CLV and A1' is disks of structure which it comes to divide into a circumferencial direction or radial by two or more sectors s, without carrying out sequential formation of two or more zones z toward a periphery at the shape of a concentric circle from inner circumference into the record section R which has a radius r, as it is used for DVD-R which is WO media mentioned above and is shown in drawing 1 . The wobble frequency which carries out the minute variation rate (wobble) of all the grooves 1 in each sector s to radial presupposes that it is fixed.

[0056] As this optical disk A1 and A1' are shown in drawing 2 , the groove width of face 1a-1c and -- are the same dimensions (as shown in drawing 3 , it is groove width-of-face 1a= groove width-of-face 1b= groove width-of-face 1c--), and the land widths 2a-2d of a land 2 and -- are also the same dimensions (as shown in drawing 3 , it is land-width 2a= land-width 2b= land-width 2c= land-width [of 2d] --). In this way, as shown in drawing 1 , a wobble configuration becomes in phase in radial [of each sector s].

[0057] Moreover, as shown in drawing 2 , on the land 2, the address which shows the whereabouts of record data forms PURIPITTO, and is recorded beforehand. Data are recorded on the groove 1 relevant to land pit 2p to which this address was given.

[0058] As described above, the addressing structure formed of the groove 1 and land pit 2p by which the wobble was carried out For example, when the track pitches of a groove 1 are 0.8 micrometers and the groove width of face 1a-1c and -- is 0.4 micrometers, The amount of displacement of the groove 1 by wobbling makes **40nm and a wobble frequency a single frequency, and the die length of the wobble configuration per period is made into 50-micrometer order, and it is formed so that it may become abbreviation regularity over the disk perimeter.

[0059] Now, carrying-out-, respectively-the rotation drive of optical disk A1' of optical disk [of this invention of CAV mentioned above] A1, and this invention of CLV ******, The following, [a rotation drive of the optical disk A1 of CAV], [data logging to the optical disk A1 of CAV], [-- CAV -- an optical disk -- A -- one -- from -- data -- playback --] -- [-- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive --] -- [-- CLV -- an optical disk -- A -- one -- ' -- data logging --] -- [-- CLV -- an optical disk -- A -- one -- ' -- from -- data -- playback --] -- ** -- order -- explaining .

[0060] Motor control block 10A for carrying out the rotation drive of the optical disk A1 of [rotation drive of optical disk A1 of CAV] CAV consists of 1-/N frequency divider 10a, servo circuit (rotation servo) 10b, motor 10c, frequency generating circuit (FG)10d, band pass filter (BPF) 10e, 1/M frequency divider 10Aa, and multiplying circuit (number of X sectors) 10Ab, as shown in drawing 12 . The same sign is given to the same component as what was mentioned above.

[0061] Motor control block 10A of a configuration of having described above operates as follows. That is, as shown in drawing 12 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 10a, it is outputted to servo circuit 10b as one input signal as a spindle reference signal. This spindle reference signal is a rotation reference signal for unrelated always obtaining a fixed disk rotational frequency in the location where the recording head (pickup) which is not illustrated carries out the record (playback) scan of the optical disk A1 top. 10d of frequency generating circuits generates the signalling frequency according to rotation of the spindle of

motor 10c, and they output this signalling frequency to servo circuit 10b as an input signal of another side. Servo circuit 10b compares the gap (difference) of signalling frequency to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.

[0062] In this way, the motor control block 10 can carry out the rotation drive of this optical disk A1 so that it may set always constant the engine speed of the optical disk A1 laid in the turntable which is not illustrated.

[0063] It is recorded at the time of [data logging to optical disk A1 of CAV] data logging, wobbling of the data being carried out to a groove 1 by the record laser beam irradiated ranging over the groove 1 of an optical disk A1, and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the recording head which is not illustrated. It can come, simultaneously incidence of the return light (reflected light from an optical disk A1) of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0064] After it is supplied to multiplying circuit 10Ab after this Push-Pull signal was supplied to 1/M frequency divider 10Aa after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 10e, and it was carried out 1/M dividing here, and multiplying is carried out here according to the sector s under writing scan, it is outputted to the recording system which is not illustrated as a reference clock for record. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result. As the above mentioned [rotation drive of the optical disk A1 of CAV] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A1 is carried out so that the number of rotations of this optical disk A1 laid in a turntable may be set always constant. Therefore, the always stabilized CAV record is attained.

[0065] The data currently recorded by carrying out wobbling to a groove 1 by the playback laser beam irradiated ranging over the data-logging finishing groove 1 of an optical disk A1 and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the pickup which is not illustrated are reproduced at the time of [data playback from optical disk A1 of CAV] data playback. It can come, simultaneously incidence of the return light (reflected light from an optical disk A1) of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0066] After it is supplied to multiplying circuit 10Ab after this Push-Pull signal is supplied to 1/M frequency divider 10Aa after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 10e, and it is carried out 1/M dividing here, and it carries out multiplying of the signal here, it is outputted to the reversion system which does not illustrate the wobble signalling frequency according to each sector s of an optical disk A1 as a reference clock for playback. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result. As the above mentioned [rotation drive of the optical disk A1 of CAV] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A1 is carried out so that the number of rotations of this optical disk A1 laid in a turntable may be set always constant. Therefore, the always stabilized CAV playback is attained.

[0067] [-- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive --] -- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive -- carrying out -- a sake -- motor control -- a block -- 11 -- A -- drawing 13 -

- being shown -- as -- one -- /-- N -- a frequency divider -- 11 -- a -- a servo -- a circuit (rotation servo) -- 11 -- b -- a motor -- 11 -- c -- a band pass filter (BPF) -- ten -- d -- one -- /-- R -- a frequency divider -- 11 -- Aa -- one -- /-- M -- a frequency divider -- 11 -- Ab -- from -- constituting -- having . The same sign is given to the same component as what was mentioned above.

[0068] Motor control block 11A of a configuration of having described above operates as follows. That is, as shown in drawing 13 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 11a, dividing of it is carried out to 1/R in 1/R frequency divider 11Aa, and it is outputted to servo circuit 11b as one input signal as a spindle reference signal. the recording head (pickup) which does not illustrate this spindle reference signal -- optical disk A1' -- it is a rotation reference signal for obtaining the disk rotational frequency which carries out sequential reduction in inverse proportion to a location radial [at the time of carrying out the record (playback) scan of the top]. Moreover, a sector separate paragraph rec/play student positional information signal is supplied to 1/R frequency divider 11Aa, and the input signal by which dividing was carried out by this to 1-/N by the division ratio according to a record playback location is used as a pan 1 / R dividing. As an input signal of another side inputted into servo circuit 11b, the reference clock for record / playback in which the Push-Pull signal passed band pass filter 11d and 1/M frequency divider 11Ab is used so that it may mention later. Servo circuit 11b compares a gap (difference) of the reference clock to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 11c so that this difference may serve as zero.

[0069] In this way, as motor control block 11A carries out sequential reduction in inverse proportion to a location radial [at the time of carrying out the record (playback) scan of the rotational frequency of optical disk A1' laid in the turntable which is not illustrated], it can carry out the rotation drive of this optical disk A1'.

[0070] [-- CLV -- an optical disk -- A -- one -- ' -- data logging --] -- data logging -- the time -- not illustrating -- a recording head -- a laser light source -- from -- an optical disk -- A -- one -- ' -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- record -- a laser beam -- a groove -- one -- data -- wobbling -- carrying out -- having -- while -- recording -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A1') of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0071] This Push-Pull signal is outputted to 1/M frequency divider 11Ab and the recording system which is not illustrated as a reference clock for record, respectively, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result.

[0072] Moreover, after dividing of the reference clock for record outputted to 1/M frequency divider 11Ab is carried out to 1/M, it is outputted to servo circuit 11b as an input signal of another side. Servo circuit 11b compares the gap (difference) of a wobble signal to a spindle reference signal carried out 1/M dividing, and it outputs a motorised signal to motor 11c so that this difference may serve as zero.

[0073] As the above mentioned [rotation drive of optical disk A1' of CLV] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A1' is carried out so that sequential reduction may be carried out in inverse proportion to a location radial [at the time of carrying out the writing scan of the number of rotations of this optical disk A1' laid in a turntable]. Therefore, the always stabilized CLV record is attained.

[0074] [-- CLV -- an optical disk -- A -- one -- ' -- from -- data -- playback --] -- data -- playback -- the time -- not illustrating -- pickup -- a laser light source -- from -- an optical disk -- A -- one -- ' -- data logging -- finishing -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- playback -- a laser beam -- a groove -- one -- wobbling -- carrying

out -- recording -- having -- **** -- data -- reproducing -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A1') of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0075] After this Push-Pull signal is outputted to 1/M frequency divider 11Ab as a reference clock for playback after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 11d, and it is carried out 1/M dividing here, it is outputted to the reversion system which is not illustrated as a reference clock for playback. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result.

[0076] Moreover, after dividing of the reference clock for playback outputted to 1/M frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.

[0077] As the above mentioned [rotation drive of optical disk A1' of CLV] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out in inverse proportion to a location radial [at the time of carrying out the playback scan of the number of rotations of this optical disk A1' laid in a turntable]. Therefore, the always stabilized CLV playback is attained.

[0078]

[Effect of the Invention] Since it is recorded or reproduced continuously according to the optical disk of this invention, without dividing data in a record section, compatibility with the DVD disk only for playbacks is good, for example. Moreover, how to use both a ZCAV method or a ZCLV method can be done, and it is the the best for a rewriting mold optical disk.

[Translation done.]

* NOTICES *

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the rewritable mold in which rapid access is possible, or a write-once (WO, ******) mold optical disk.

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PRIOR ART

[Description of the Prior Art] "DVD(digital videodisc)-R" further large-capacity-ized from current and the so-called "the CD(compact disk)-R (Recordable)" is going to be produced commercially. This DVD-R is WO media equipped with the memory capacity of one side 3.9GByte or 4.7GByte, and the CLV (Constant Linear Velocity) recording method is adopted like DVD only for playbacks. The double-sided disk which stuck the veneer disk with a thickness [with the same specification of DVD-R / as DVD only for playbacks] of 0.6mm, or one side can consider the single-sided disk of a dummy plate. 0.8 micrometers and the shortest pit length of a track pitch are 0.44 micrometers. The wavelength of the playback laser beam for reproducing the information which irradiated the wavelength and this continuation guide rail of a record laser beam for, irradiating the spiral continuation guide rail (a groove, ****) which forms the record section of DVD-R on the other hand, and recording information, and was recorded there is 635nm - 650nm, respectively.
[0003] By the way, there is the need of reducing the rotational frequency of the disk by the side of a periphery for a time rather than an inner circumference side (it illustrating to this drawing (A)) so that CLV may be a recording method which makes linear velocity regularity ranging from the inner circumference to a periphery of a disk as shown in drawing 14 (A) - (D) (it illustrates to this drawing (B)), for this reason it may be in inverse proportion to the record playback location in a groove. And a transfer rate and linear density need to be fixed ranging from the inner circumference to a periphery of a disk respectively (for it to illustrate to this drawing (C) and (D)).
[0004] Moreover, this DVD-R is minute displacement (wobble = wobble) to radial about a groove 1 at a fixed frequency so that fixed linear density may be obtained ranging from the inner circumference to a periphery of a disk. CLV record playback is enabled by controlling the rotational frequency of a disk by forming so that this reproduced wobble frequency (single carrier frequency) always becomes fixed. ** wobbling is performed for the anti-copying of a disk.
[0005] Thus, the above mentioned wobble condition in DVD-R As the value of one period of the wobble formed in each groove 1 serves as size from the inner circumference of a disk gradually in proportion to going to a periphery and it is shown in drawing 17 consequently Since each groove 1 will be in the condition of carrying out the wobble to radial at random, the groove width of face 1a-1c and -- are not fixed, and land widths 2a-2d and -- also become less fixed [--].

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EFFECT OF THE INVENTION

[Effect of the Invention] Since it is recorded or reproduced continuously according to the optical disk of this invention, without dividing data in a record section, compatibility with the DVD disk only for playbacks is good, for example. Moreover, how to use both a ZCAV method or a ZCLV method can be done, and it is the the best for a rewriting mold optical disk.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] There are the following technical problems in the above mentioned DVD-R. That is, DVD-R of CLV needs to adjust the engine speed of a disk minutely according to a radial data-logging location, and to always control linear velocity and a wobble frequency uniformly at the time of the use. For this reason, while the high density record with a fixed transfer rate and linear density was possible for DVD-R of CLV at the time of record of data, at the time of playback (at the time [Especially] of seeking), by the time it reached the predetermined rotational frequency of the disk which becomes settled uniquely corresponding to the sought previous location, it required time amount, and there was a technical problem that rapid access became difficult in it.
[0007] Then, this invention is made in order to solve this paying attention to the above mentioned technical problem, and it offers the optical disk of (1) - (4) which carries out the following.
[0008] (1) As shown in drawing 1 , divide data storage area R ranging from the inner circumference to a periphery of a disk into many zones z in the shape of a concentric circle, and offer WO or the rewriting mold optical disk of structure which set constant the wobble frequency of the wobble which carries out minute displacement crosswise [groove / a] except for each zone boundary section sb.
[0009] (2) Moreover, it is ZCAV (Zoned Constant AngularVelocity, Zone CAV) about the optical disk of such structure. It provides as the optical disk (it had the property illustrated to drawing 15) of a method, or an optical disk (it had the property illustrated to drawing 16) of a ZCLV (Zoned Constant Linear Velocity, Zone CLV) method.
[0010] (3) Furthermore, this invention offers WO or the rewriting mold optical disk of structure which set constant the groove width of face 1a-1c covering the perimeter, and --, without dividing the record section R of data into many zones z in the shape of a concentric circle.
[0011] (4) Offer the optical disk of such structure as the optical disk of CLV, or an optical disk of CAV further again.

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MEANS

[Means for Solving the Problem] In order to solve the above-mentioned technical problem, this invention offers the optical disk which becomes the configuration of following (1) and (2).
[0013] (1) It has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded, as shown in drawing 1 - drawing 3 . In optical disk A.A' to which it comes to carry out zoning of this groove 1 to radial (ZCAV or ZCLV method) said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) The optical disk with which the groove width of face 1a-1c and -- are characterized by what is been abbreviation regularity (the groove width of face 1a-1c by which the wobble was carried out into each zone z, and the phase of -- are the same) over the perimeter of a disk except for the zone boundary sb.
[0014] In the optical disk which has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded (2) Said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) The groove width of face 1a-1c, the optical disk with which -- is characterized by what is been abbreviation regularity (the groove width of face 1a-1c by which the wobble was carried out in the record section R, and the phase of -- are the same) over the perimeter (the record section R of a disk) of a disk.
[0015]
[The mode of implementation of invention] Hereafter, the optical disk of this invention is explained using drawing 1 - drawing 13 , drawing 14 - drawing 16 . An enlarged drawing for drawing for drawing 1 to explain the whole optical disk structure of this invention and drawing 2 to explain the structure of the optical disk of this invention, Drawing for drawing 3 to explain the groove land condition in the optical disk of this invention by which wobbling was carried out, Drawing for drawing 4 to explain the groove land condition in the zone boundary of the optical disk of this invention, many properties (a disk rotational frequency --) in the optical disk of a ZCAV method with common drawing 5 Drawing for explaining linear velocity, a transfer rate, and linear density, drawing 6 , drawing showing the 1st and 2nd example of the motor control block with which drawing 12 drives the optical disk of this invention, respectively, Drawing 7 , drawing showing the 1st and 2nd example of the motor control block with which drawing 13 drives the optical disk of this invention, respectively, many properties (a disk rotational frequency --) in the optical disk of a ZCLV method with common drawing 8 Drawing for drawing for explaining linear velocity, a transfer rate, and linear density and drawing 9 to explain the groove land condition in the optical disk of general CLV by which wobbling was carried out, Drawing for drawing 10 to explain the wobble signal amplitude which played the optical disk of the general CLV equipped with the groove land by which wobbling was carried out, Drawing for drawing 11 to explain the wobble signal amplitude which played the optical disk of this invention, many properties (a disk rotational frequency --) in the optical disk of CLV with common drawing 14 many properties [in / in drawing for explaining linear velocity, a transfer rate, and linear density, and drawing 15 / the optical disk of this invention of a ZCAV method] (a wobble frequency --) Drawing for explaining a disk engine

speed and drawing 16 are drawings for explaining many properties (a wobble frequency, disk engine speed) in the optical disk of this invention of a ZCLV method.
[0016] As the optical disk of this invention is used for DVD-R which is WO media mentioned above and is shown in drawing 1 , sequential formation of two or more zones z is carried out toward the periphery at the shape of a concentric circle from inner circumference into the record section R which has a radius r (the example of this drawing four zones z), and this record section R is divided by each zone z in the shape of a concentric circle (the so-called zoning). Each zone z is divided into a circumferencial direction by further two or more sectors s. The wobble frequency which carries out the minute variation rate (wobble) of all the grooves 1 in each zone z by which zoning was carried out to radial presupposes that it is fixed.
[0017] That is, as the optical disk of this invention is shown in drawing 2 , the groove width of face 1a-1c of a groove 1 and -- are the same dimensions (as shown in drawing 3 , it is groove width-of-face 1a= groove width-of-face 1b= groove width-of-face 1c--), and the land widths 2a-2d of a land 2 and -- are also the same dimensions (as shown in drawing 3 , it is land-width 2a= land-width 2b= land-width 2c= land-width [of 2d] --). In this way, as shown in drawing 1 , the groove width of face 1a-1c and -- which make a starting position the initiation line sc of each zone boundary sb and by which the wobble was carried out become in phase in each zone z.
[0018] Moreover, as shown in drawing 2 , on the land 2, the address which shows the whereabouts of record data forms PURIPITTO, and is recorded beforehand. Data are recorded on the groove 1 relevant to land pit 2p to which this address was given.
[0019] As described above, the addressing structure formed of the groove 1 and land pit 2p by which the wobble was carried out For example, when the track pitches (groove width-of-face + land width) of a groove 1 are 0.8 micrometers and the groove width of face 1a-1c and -- is 0.4 micrometers, The amount of displacement of the groove 1 by wobbling makes **40nm and a wobble frequency a single frequency, and the die length of the wobble configuration per period is made into 50-micrometer order, and it is formed so that it may become abbreviation regularity over the disk perimeter.
[0020] as the initiation line sc of said zone boundary sb carried out shows drawing 4 , optical disk A rotates one time -- ** -- in order to form so that it may be alike and may appear once , optical disk A rotates one time -- ** -- it is perform that it is alike and only a specific field part changes groove width of face and a land width (the field of a shadow area shows starting position 2AB and its termination location 2AA of the land 2 corresponding to one rotation of optical disk A among this drawing) .
[0021] That is, although it is groove width-of-face 1aa= groove width-of-face 1ab= groove width-of-face 1ac= groove width-of-face 1ad= groove width-of-face 1ae of a groove 1, it is land-width 2ab!= land-width 2ac. Moreover, although it is groove width-of-face 1ba= groove width-of-face 1bb= groove width-of-face 1bc= groove width-of-face 1bd= groove width-of-face 1be, it is land-width 2bc!= width-of-face 2bd.
[0022] By the way, the optical disk of this invention can consist of any methods of a ZCAV method and a ZCLV method. the following -- [-- ZCAV -- a method -- this invention -- an optical disk -- A --] -- [-- being general -- ZCAV -- a method -- an optical disk --] -- [-- ZCLV -- a method -- this invention -- an optical disk -- A -- ' --] -- [-- being general -- ZCLV -- a method -- an optical disk --] -- order -- explaining .
[0023] Optical disk A of this invention of a [optical disk [of this invention of a ZCAV method] A] ZCAV method is divided into many zones z in the shape of a concentric circle in the record section R from the inner circumference of a disk to a periphery, as shown in drawing 1 , drawing 15 (A), and (B). The variation rate (wobbling) of the spiral groove 1 in each zone z is carried out crosswise [groove / a] by the single wobble frequency set to every zone z, consequently it is fixed over the perimeter. [of each groove width of face 1a-1c and --] And the rotation drive of this optical disk A is always carried out at a fixed disk engine speed, and the single wobble frequency set to every zone z presupposes that it increases stair-like in proportion to radial [of a disk] according to this.
[0024] The optical disk of a general ZCAV method to [optical disk [of this invention of a ZCAV method] A] which carried out the [optical disk of general ZCAV method] above is explained using

drawing 5 (A) - (D). The groove width of face in each zone z to whose groove width of face in each zone z not being [the optical disk of a general ZCAV method] the same of optical disk A of a ZCAV method is the same over the perimeter, and only this is both difference.
[0025] The rotation drive of the optical disk of this general ZCAV method is always carried out at a fixed disk engine speed (it illustrates to this drawing (A)), consequently linear velocity increases gradually ranging from the inner circumference to a periphery of a disk (it illustrates to this drawing (B)). Moreover, a transfer rate carries out a sequential increment stair-like in proportion to a radial zone z location, and further, although linear density changes minutely in proportion to a location radial [in each zone z] (it illustrates to this drawing (C)), this minute variation becomes fixed in all the zones z (it illustrates to this drawing (D)).
[0026] [optical disk A' of a ZCLV method] -- on the other hand, optical disk A' of this invention of a ZCLV method is divided into many zones z in the shape of a concentric circle in the record section R from the inner circumference of a disk to a periphery, as shown in drawing 16 (A) and (B). The variation rate (wobbling) of the spiral groove 1 in each zone z is carried out crosswise [groove / a] by the single wobble frequency set to every zone z, consequently it is fixed over the perimeter. [of each groove width of face 1a-1c and --] And a rotation drive is carried out so that a fixed wobble frequency may always be obtained, for this reason this optical disk A' presupposes a rotational frequency that sequential reduction is carried out stair-like in inverse proportion to a radial zone z location.
[0027] The optical disk of a general ZCLV method to {optical disk A' of a ZCLV method} which carried out the [optical disk of general ZCLV method] above is explained using drawing 8 (A) - (D). The groove width of face in each zone z to whose groove width of face in each zone z not being [the optical disk of a general ZCLV method] the same of optical disk A' of a ZCLV method is the same over the perimeter, and only this is both difference.
[0028] The optical disk of this general ZCLV method is what carries out sequential reduction of the disk rotational frequency gradually in inverse proportion to a radial zone z location in order to always obtain a fixed linear velocity (it illustrates to this drawing (A)). Consequently, although linear velocity changes minutely in proportion to a location radial [in each zone z], this minute variation becomes fixed in all the zones z (it illustrates to this drawing (B)). Moreover, a transfer rate becomes fixed unrelated always in each zone z location (it illustrates to this drawing (C)), and further, although linear density changes minutely in inverse proportion to a location radial [in each zone z], this minute variation becomes fixed in all the zones z (it illustrates to this drawing (D)).
[0029] It things-******. now -- having mentioned above -- {-- ZCAV -- a method -- this invention -- an optical disk -- A --} -- {-- ZCLV -- a method -- this invention -- an optical disk -- A -- ' --} -- respectively -- a rotation drive -- carrying out -- The following, [a rotation drive of optical disk A of a ZCAV method], [data logging to optical disk A of a ZCAV method], [-- ZCAV -- a method -- an optical disk -- A -- from -- data -- playback --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- data logging --] -- [-- ZCLV -- a method -- an optical disk -- A -- ' -- from -- data -- playback --] -- ** -- order -- explaining .
[0030] The motor control block 10 for carrying out the rotation drive of the optical disk A of a [rotation drive of optical disk A of ZCAV method] ZCAV method consists of 1-/N frequency divider 10a, servo circuit 10b, motor 10c, frequency generating circuit (FG)10d, and band pass filter (BPF) 10e, as shown in drawing 6 .
[0031] The motor control block 10 of a configuration of having described above operates as follows. That is, as shown in drawing 6 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 10a, it is outputted to servo circuit 10b as one input signal as a spindle reference signal. This spindle reference signal is a rotation reference signal for unrelated always obtaining a fixed disk rotational frequency in a zone z location radial [at the time of the recording head (pickup) which is not illustrated carrying out the record (playback) scan of the optical disk A top]. 10d of frequency generating circuits generates the signalling frequency according to rotation of the spindle of motor 10c, and they output this signalling frequency to servo circuit 10b as an input signal of another side. Servo circuit 10b compares the gap (difference) of

signalling frequency to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.
[0032] In this way, the motor control block 10 can carry out the rotation drive of this optical disk A so that it may set always constant the engine speed of optical disk A laid in the turntable which is not illustrated.
[0033] It is recorded at the time of [data logging to optical disk A of ZCAV method] data logging, wobbling of the data being carried out to a groove 1 by the record laser beam irradiated ranging over the groove 1 of optical disk A, and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the recording head which is not illustrated. It can come, simultaneously incidence of the return light (reflected light from optical disk A) of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0034] This Push-Pull signal is outputted to the recording system which is not illustrated as a reference clock for record, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 10e. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result. As the above mentioned [rotation drive of optical disk A of a ZCAV method] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A is carried out so that the number of rotations of this optical disk A laid in a turntable may be set always constant. Therefore, the always stabilized ZCAV record is attained.
[0035] The data currently recorded by carrying out wobbling to a groove 1 by the playback laser beam irradiated ranging over the data-logging finishing groove 1 of optical disk A and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the pickup which is not illustrated are reproduced at the time of [data playback from optical disk [of a ZCAV method] A] data playback. It can come, simultaneously incidence of the return light (reflected light from optical disk A) of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0036] This Push-Pull signal is outputted to the reversion system which is not illustrated as a reference clock for playback, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 10e. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result. As the above mentioned [rotation drive of optical disk A of a ZCAV method] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A is carried out so that the number of rotations of this optical disk A laid in a turntable may be set always constant. Therefore, the always stabilized ZCAV playback is attained.
[0037] [-- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive --] -- ZCLV -- a method -- an optical disk -- A -- ' -- rotation -- a drive -- carrying out -- a sake -- motor control -- a block -- 11 -- drawing 7 -- being shown -- as -- one -- /-- N -- a frequency divider -- 11 -- a -- a servo -- a circuit -- 11 -- b -- a motor -- 11 -- c -- a band pass filter (BPF) -- 11 -- d -- one -- /-- N -- ' -- a frequency divider -- 11 -- e -- from -- constituting -- having .
[0038] The motor control block 11 of a configuration of having described above operates as follows. That is, as shown in drawing 7 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 11a, it is outputted to servo circuit 11b as one input signal as a spindle reference signal. the recording head (pickup) which does not illustrate this spindle reference signal -- optical disk A' -- it is a rotation reference signal for obtaining

the disk rotational frequency which carries out sequential reduction stair-like in inverse proportion to a zone z location radial [at the time of carrying out the record (playback) scan of the top]. As an input signal of another side inputted into servo circuit 11b, the reference clock for record / playback pass Push-Pull signal band pass filter 11d and 1/N'frequency divider 11e is used so that it may mention later. Servo circuit 11b compares a gap (difference) of the reference clock to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.
[0039] In this way, the motor control block 11 can carry out the rotation drive of this optical disk A so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the record (playback) scan of the rotational frequency of optical disk A' laid in the turntable which is not illustrated].
[0040] [-- ZCLV -- a method -- an optical disk -- A -- ' -- data logging --] -- data logging -- the time -- not illustrating -- a recording head -- a laser light source -- from -- an optical disk -- A -- ' -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- record -- a laser beam -- a groove -- one -- data -- wobbling -- carrying out -- having -- while -- recording -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A') of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0041] This Push-Pull signal is outputted to 1/N'frequency divider 11e and the recording system which is not illustrated as a reference clock for record, respectively, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result.
[0042] Moreover, after dividing of the reference clock for record outputted to 1/N'frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.
[0043] As the above mentioned [rotation drive of optical disk A' of a ZCLV method] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the writing scan of the rotational frequency of this optical disk A' laid in a turntable]. Therefore, the always stabilized ZCLV record is attained.
[0044] [-- ZCLV -- a method -- an optical disk -- A -- ' -- from -- data -- playback --] -- data -- playback -- the time -- not illustrating -- pickup -- a laser light source -- from -- an optical disk -- A -- ' -- data logging -- finishing -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- playback -- a laser beam -- a groove -- one -- wobbling -- carrying out -- recording -- having -- **** -- data -- reproducing -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A') of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0045] This Push-Pull signal is outputted to the reversion system which is not illustrated as a reference clock for playback, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result.

[0046] Moreover, after dividing of the reference clock for playback outputted to 1/N'frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.
[0047] As the above mentioned [rotation drive of optical disk A' of a ZCLV method] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out stair-like in inverse proportion to a zone z location radial [at the time of carrying out the playback scan of the rotational frequency of this optical disk A' laid in a turntable]. Therefore, the always stabilized ZCLV playback is attained.
[0048] By the way, it sets to playback of the optical disk of the general CLV equipped with many properties (a disk engine speed, linear velocity, a transfer rate, linear density) shown in drawing 14 . As shown in drawing 9 , the level of the wobble signal acquired from the return light (reflected light) of the playback laser beam irradiated ranging over the groove 1 on which data were recorded, and the lands 2 and 2 of the both ends of this groove 1 It was indispensable to have performed waveform shaping which there is a problem which varies as follows, removes dispersion in level in the reversion system using such a wobble signal, and is made into the wobble signal of fixed level.
[0049] That is, as shown in drawing 9 , the phase of the wobble signal wave form acquired based on the return light of the playback laser beam which scans the location AA of land-width 2ca!= width-of-face 2cb of a wobble does not correspond in the groove cross direction a. For this reason, the amplitude of the wobble signal wave form acquired in this way is level shown with a broken line like the wobble signal amplitude shown in the left-hand side in drawing 10 , and is a low comparatively.
[0050] On the other hand, as shown in drawing 9 , the phase of the wobble signal wave form acquired based on the return light of the playback laser beam which scans the location AB of land-width 2deca= width-of-face 2db which exists rarely of a wobble corresponds in the groove cross direction a. For this reason, the level higher than said level shown with a broken line like the wobble signal amplitude which shows the amplitude of the wobble signal wave form acquired in this way to the right-hand side in drawing 10 is obtained. Thus, the level of the wobble signal reproduced by the location to scan varies at the time of playback of the optical disk of general CLV.
[0051] by the way -- having mentioned above -- ZCAV -- a method -- depending -- this invention -- an optical disk -- A -- or -- ZCLV -- a method -- depending -- this invention -- an optical disk -- A -- ' -- playback -- setting -- As shown in drawing 3 and drawing 4 , the above mentioned zone boundary sb (starting position 2AB and its termination location 2AA of a land 2) is removed. Since the land width is uniformly formed over the perimeter of a disk so that the phase of a wobble may be made in agreement by radial It cannot be overemphasized that it becomes always fixed [the level of the wobble signal acquired based on the return light of the playback laser beam irradiated ranging over the groove 1 by which data logging was carried out, and the lands 2 and 2 of the both ends of this groove 1].
[0052] Consequently, this can be used in the reversion system using such a wobble signal, without performing waveform shaping which removes dispersion in level and is made into the wobble signal of fixed level.
[0053] That is, since all of the land width of the lands 2 and 2 of the both ends of a groove 1 are in agreement except for the zone boundary sb, the wobble signal of fixed level can always be acquired like the wobble signal amplitude shown in drawing 11 . in this way -- ZCAV -- a method -- depending -- this invention -- an optical disk -- A -- or -- ZCLV -- a method -- depending -- this invention -- an optical disk -- A -- ' -- playback -- the time -- **** -- the amplitude -- a wobble signal with high fixed dependability can be acquired.
[0054] Now, although each optical disk [of this invention of the ZCAV method mentioned above or a ZCLV method] A and A' was an optical disk equipped with the zone boundary sb The optical disk A1 of this invention of the CAV explained below or CLV and A1' All of the groove width of face 1a-1c and -- are the optical disks of regularity (all also of land widths 2a-2d and -- are fixed) like optical disk A which all are the disks which are not equipped with the zone boundary sb, and described them above,

and A'. CAV -- or -- CLV -- this invention -- an optical disk -- A -- one -- A -- one -- ' -- structure -- having mentioned above -- ZCAV -- a method -- or -- ZCLV -- a method -- an optical disk -- A -- A -- ' -- comparing -- a zone -- a boundary -- sb -- having -- **** -- a point -- being different -- only -- it is -- structures other than this -- being the same .

[0055] That is, each of optical disks A1 of this invention of CAV or CLV and A1' is disks of structure which it comes to divide into a circumferencial direction or radial by two or more sectors s, without carrying out sequential formation of two or more zones z toward a periphery at the shape of a concentric circle from inner circumference into the record section R which has a radius r, as it is used for DVD-R which is WO media mentioned above and is shown in drawing 1 . The wobble frequency which carries out the minute variation rate (wobble) of all the grooves 1 in each sector s to radial presupposes that it is fixed.

[0056] As this optical disk A1 and A1' are shown in drawing 2 , the groove width of face 1a-1c and -- are the same dimensions (as shown in drawing 3 , it is groove width-of-face 1a= groove width-of-face 1b= groove width-of-face 1c--), and the land widths 2a-2d of a land 2 and -- are also the same dimensions (as shown in drawing 3 , it is land-width 2a= land-width 2b= land-width 2c= land-width [of 2d] --). In this way, as shown in drawing 1 , a wobble configuration becomes in phase in radial [of each sector s].

[0057] Moreover, as shown in drawing 2 , on the land 2, the address which shows the whereabouts of record data forms PURIPITTO, and is recorded beforehand. Data are recorded on the groove 1 relevant to land pit 2p to which this address was given.

[0058] As described above, the addressing structure formed of the groove 1 and land pit 2p by which the wobble was carried out For example, when the track pitches of a groove 1 are 0.8 micrometers and the groove width of face 1a-1c and -- is 0.4 micrometers, The amount of displacement of the groove 1 by wobbling makes **40nm and a wobble frequency a single frequency, and the die length of the wobble configuration per period is made into 50-micrometer order, and it is formed so that it may become abbreviation regularity over the disk perimeter.

[0059] Now, carrying-out-, respectively-the rotation drive of optical disk A1' of optical disk [of this invention of CAV mentioned above] A1, and this invention of CLV ******, The following, [a rotation drive of the optical disk A1 of CAV], [data logging to the optical disk A1 of CAV], [-- CAV -- an optical disk -- A -- one -- from -- data -- playback --] -- [-- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive --] -- [-- CLV -- an optical disk -- A -- one -- ' -- data logging --] -- [-- CLV -- an optical disk -- A -- one -- ' -- from -- data -- playback --] -- ** -- order -- explaining .

[0060] Motor control block 10A for carrying out the rotation drive of the optical disk A1 of [rotation drive of optical disk A1 of CAV] CAV consists of 1-/N frequency divider 10a, servo circuit (rotation servo) 10b, motor 10c, frequency generating circuit (FG)10d, band pass filter (BPF) 10e, 1/M frequency divider 10Aa, and multiplying circuit (number of X sectors) 10Ab, as shown in drawing 12 . The same sign is given to the same component as what was mentioned above.

[0061] Motor control block 10A of a configuration of having described above operates as follows. That is, as shown in drawing 12 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 10a, it is outputted to servo circuit 10b as one input signal as a spindle reference signal. This spindle reference signal is a rotation reference signal for unrelated always obtaining a fixed disk rotational frequency in the location where the recording head (pickup) which is not illustrated carries out the record (playback) scan of the optical disk A1 top. 10d of frequency generating circuits generates the signalling frequency according to rotation of the spindle of motor 10c, and they output this signalling frequency to servo circuit 10b as an input signal of another side. Servo circuit 10b compares the gap (difference) of signalling frequency to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 10c so that this difference may serve as zero.

[0062] In this way, the motor control block 10 can carry out the rotation drive of this optical disk A1 so that it may set always constant the engine speed of the optical disk A1 laid in the turntable which is not illustrated.

[0063] It is recorded at the time of [data logging to optical disk A1 of CAV] data logging, wobbling of the data being carried out to a groove 1 by the record laser beam irradiated ranging over the groove 1 of an optical disk A1, and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the recording head which is not illustrated. It can come, simultaneously incidence of the return light (reflected light from an optical disk A1) of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0064] After it is supplied to multiplying circuit 10Ab after this Push-Pull signal was supplied to 1/M frequency divider 10Aa after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 10e, and it was carried out 1/M dividing here, and multiplying is carried out here according to the sector s under writing scan, it is outputted to the recording system which is not illustrated as a reference clock for record. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result. As the above mentioned [rotation drive of the optical disk A1 of CAV] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A1 is carried out so that the number of rotations of this optical disk A1 laid in a turntable may be set always constant. Therefore, the always stabilized CAV record is attained.
[0065] The data currently recorded by carrying out wobbling to a groove 1 by the playback laser beam irradiated ranging over the data-logging finishing groove 1 of an optical disk A1 and the lands 2 and 2 of the both ends of this groove 1 from the laser light source of the pickup which is not illustrated are reproduced at the time of [data playback from optical disk A1 of CAV] data playback. It can come, simultaneously incidence of the return light (reflected light from an optical disk A1) of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 10e. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.
[0066] After it is supplied to multiplying circuit 10Ab after this Push-Pull signal is supplied to 1/M frequency divider 10Aa after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 10e, and it is carried out 1/M dividing here, and it carries out multiplying of the signal here, it is outputted to the reversion system which does not illustrate the wobble signalling frequency according to each sector s of an optical disk A1 as a reference clock for playback. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result. As the above mentioned [rotation drive of the optical disk A1 of CAV] described on the other hand, it cannot be overemphasized that the rotation drive of the optical disk A1 is carried out so that the number of rotations of this optical disk A1 laid in a turntable may be set always constant. Therefore, the always stabilized CAV playback is attained.
[0067] [-- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive --] -- CLV -- an optical disk -- A -- one -- ' -- rotation -- a drive -- carrying out -- a sake -- motor control -- a block -- 11 -- A -- drawing 13 -- being shown -- as -- one -- /-- N -- a frequency divider -- 11 -- a -- a servo -- a circuit (rotation servo) -- 11 -- b -- a motor -- 11 -- c -- a band pass filter (BPF) -- ten -- d -- one -- /-- R -- a frequency divider -- 11 -- Aa -- one -- /-- M -- a frequency divider -- 11 -- Ab -- from -- constituting -- having . The same sign is given to the same component as what was mentioned above.
[0068] Motor control block 11A of a configuration of having described above operates as follows. That is, as shown in drawing 13 , after dividing of the clock Xtal outputted from the oscillator circuit which is not illustrated is carried out to 1/N by 1-/N frequency divider 11a, dividing of it is carried out to 1/R in

1/R frequency divider 11Aa, and it is outputted to servo circuit 11b as one input signal as a spindle reference signal. the recording head (pickup) which does not illustrate this spindle reference signal -- optical disk A1' -- it is a rotation reference signal for obtaining the disk rotational frequency which carries out sequential reduction in inverse proportion to a location radial [at the time of carrying out the record (playback) scan of the top]. Moreover, a sector separate paragraph rec/play student positional information signal is supplied to 1/R frequency divider 11Aa, and the input signal by which dividing was carried out by this to 1-/N by the division ratio according to a record playback location is used as a pan 1 / R dividing. As an input signal of another side inputted into servo circuit 11b, the reference clock for record / playback in which the Push-Pull signal passed band pass filter 11d and 1/M frequency divider 11Ab is used so that it may mention later. Servo circuit 11b compares a gap (difference) of the reference clock to a spindle reference signal, and it outputs a motorised signal (drive current) to motor 11c so that this difference may serve as zero.

[0069] In this way, as motor control block 11A carries out sequential reduction in inverse proportion to a location radial [at the time of carrying out the record (playback) scan of the rotational frequency of optical disk A1' laid in the turntable which is not illustrated], it can carry out the rotation drive of this optical disk A1'.

[0070] [-- CLV -- an optical disk -- A -- one -- ' -- data logging --] -- data logging -- the time -- not illustrating -- a recording head -- a laser light source -- from -- an optical disk -- A -- one -- ' -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- record -- a laser beam -- a groove -- one -- data -- wobbling -- carrying out -- having -- while -- recording -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A1') of a record laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the record location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0071] This Push-Pull signal is outputted to 1/M frequency divider 11Ab and the recording system which is not illustrated as a reference clock for record, respectively, after the signal component of unnecessary bands other than a wobble frequency component is removed by band pass filter 11d. It judges whether in a recording system, this reference clock corresponds to the wobbling signal amplitude of normal, and record actuation of a recording head is controlled based on this judgment result.

[0072] Moreover, after dividing of the reference clock for record outputted to 1/M frequency divider 11Ab is carried out to 1/M, it is outputted to servo circuit 11b as an input signal of another side. Servo circuit 11b compares the gap (difference) of a wobble signal to a spindle reference signal carried out 1/M dividing, and it outputs a motorised signal to motor 11c so that this difference may serve as zero.

[0073] As the above mentioned [rotation drive of optical disk A1' of CLV] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A1' is carried out so that sequential reduction may be carried out in inverse proportion to a location radial [at the time of carrying out the writing scan of the number of rotations of this optical disk A1' laid in a turntable]. Therefore, the always stabilized CLV record is attained.

[0074] [-- CLV -- an optical disk -- A -- one -- ' -- from -- data -- playback --] -- data -- playback -- the time -- not illustrating -- pickup -- a laser light source -- from -- an optical disk -- A -- one -- ' -- data logging -- finishing -- a groove -- one -- and -- this -- a groove -- one -- both ends -- a land -- two -- two -- straddling -- irradiating -- having -- playback -- a laser beam -- a groove -- one -- wobbling -- carrying out -- recording -- having -- **** -- data -- reproducing -- having . It can come, simultaneously incidence of the return light (reflected light from optical disk A1') of a playback laser beam is carried out to the quadrisection detector which is not illustrated. This quadrisection detector detects the playback location condition of having quadrisected and obtained the reflected light, and outputs the Push-Pull signal which is a tracking error detecting signal to band pass filter 11d. The fluctuation component by the above mentioned wobbling is included in this Push-Pull signal, and this fluctuation component has the single wobble frequency component.

[0075] After this Push-Pull signal is outputted to 1/M frequency divider 11Ab as a reference clock for playback after the signal component of unnecessary bands other than a wobble frequency component was removed by band pass filter 11d, and it is carried out 1/M dividing here, it is outputted to the reversion system which is not illustrated as a reference clock for playback. In a reversion system, it judges whether this reference clock is the wobbling signal amplitude of normal, and playback actuation of pickup is controlled based on this judgment result.
[0076] Moreover, after dividing of the reference clock for playback outputted to 1/M frequency divider 11e is carried out to 1-/N', it is outputted to servo circuit 11b as an input signal of another side. 1 [as opposed to a spindle reference signal in servo circuit 11b]-/N' -- the gap (difference) of a wobble signal which carried out dividing is compared, and a motorised signal is outputted to motor 11c so that this difference may serve as zero.
[0077] As the above mentioned [rotation drive of optical disk A1' of CLV] described on the other hand, it cannot be overemphasized that the rotation drive of optical disk A' is carried out so that sequential reduction may be carried out in inverse proportion to a location radial [at the time of carrying out the playback scan of the number of rotations of this optical disk A1' laid in a turntable]. Therefore, the always stabilized CLV playback is attained.

[Translation done.]

* NOTICES *

1.This document has been translated by computer. So the translation may not reflect the original precisely.
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]
[Drawing 1] It is drawing for explaining the whole optical disk structure of this invention.
[Drawing 2] It is an enlarged drawing for explaining the structure of the optical disk of this invention.
[Drawing 3] It is drawing for explaining the groove land condition in the optical disk of this invention by which wobbling was carried out.
[Drawing 4] It is drawing for explaining the groove land condition in the zone boundary of the optical disk of this invention.
[Drawing 5] It is drawing for explaining many properties (a disk rotational frequency, linear velocity, a transfer rate, linear density) in the optical disk of a general ZCAV method. It comes out.
[Drawing 6] It is drawing showing the 1st example of the motor control block which drives the optical disk of this invention of a ZCAV method.
[Drawing 7] It is drawing showing the 1st example of the motor control block which drives the optical disk of this invention of a ZCLV method.
[Drawing 8] It is drawing for explaining many properties (a disk rotational frequency, linear velocity, a transfer rate, linear density) in the optical disk of a general ZCLV method.
[Drawing 9] It is drawing for explaining the groove land condition in the optical disk of general CLV by which wobbling was carried out.
[Drawing 10] It is drawing for explaining the wobble signal amplitude which played the optical disk of the general CLV equipped with the groove land by which wobbling was carried out. .
[Drawing 11] It is drawing for explaining the wobble signal amplitude which played the optical disk of this invention.
[Drawing 12] It is drawing showing the 2nd example of the motor control block which drives the optical disk of this invention of a ZCAV method.
[Drawing 13] It is drawing showing the 2nd example of the motor control block which drives the optical disk of this invention of a ZCLV method.
[Drawing 14] It is drawing for explaining many properties (a disk rotational frequency, linear velocity, a transfer rate, linear density) in the optical disk of general CLV.
[Drawing 15] It is drawing for explaining many properties (a wobble frequency, disk rotational frequency) in the optical disk of this invention of a ZCAV method.
[Drawing 16] It is drawing for explaining many properties (a wobble frequency, disk rotational frequency) in the optical disk of this invention of a ZCLV method.
[Drawing 17] It is an enlarged drawing for explaining the structure of the conventional optical disk.
[Description of Notations]
1 Groove
1a-1c Groove width of face
2 Lands 2a-2D Land Width
2p Land pit
Groove cross direction

A. A1, A', A'1 Optical disk
sb Zone boundary
z Zone

[Translation done.]

* NOTICES *

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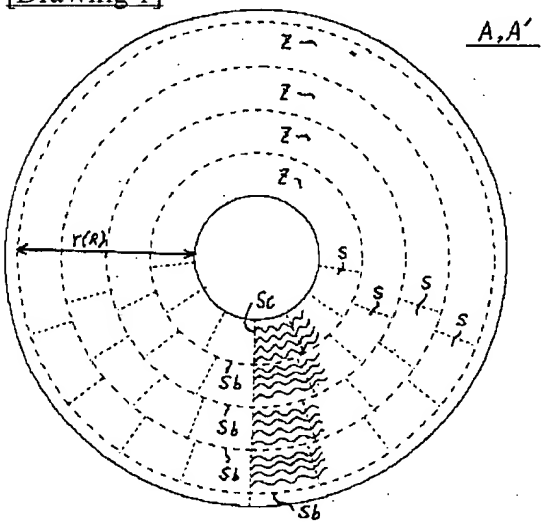
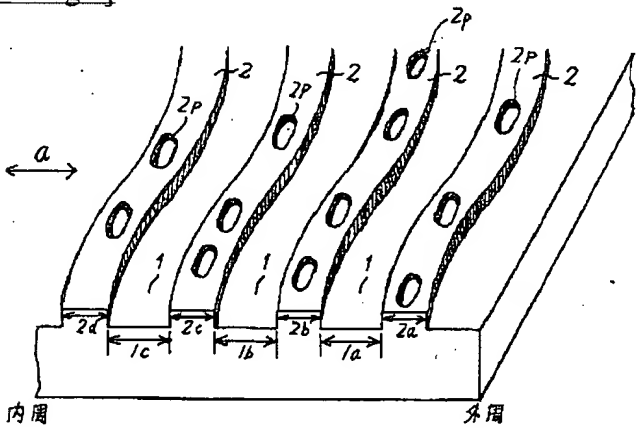
2.**** shows the word which can not be translated.
3.In the drawings, any words are not translated.

DRAWINGS

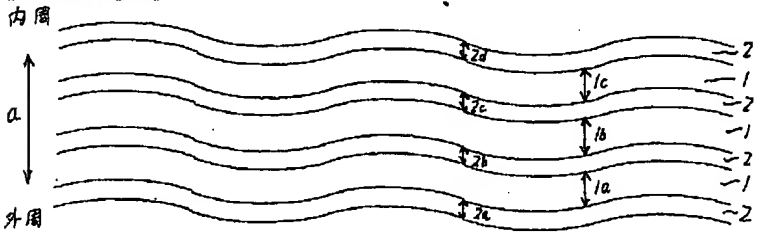
[Drawing 1]



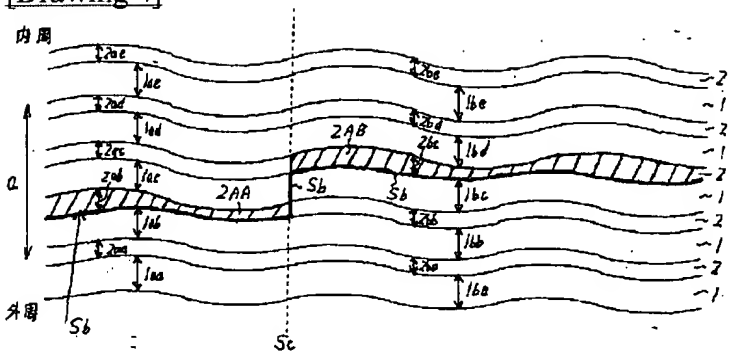
[Drawing 2]



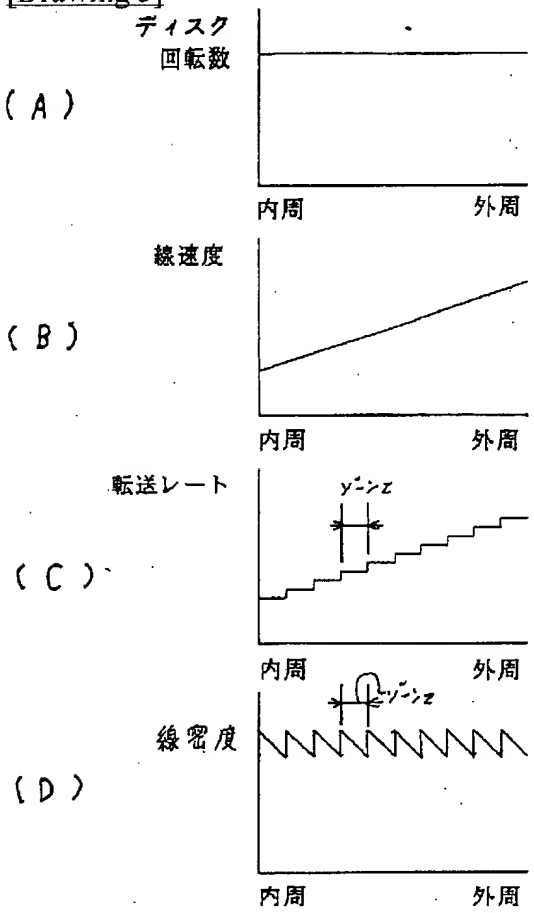
[Drawing 3]



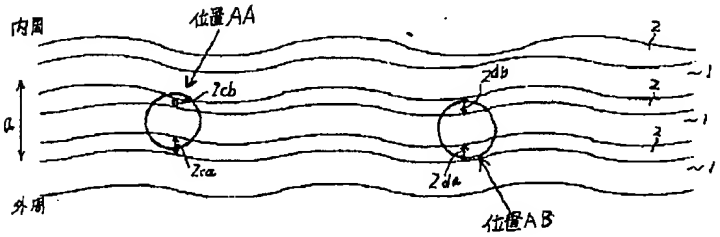
[Drawing 4]



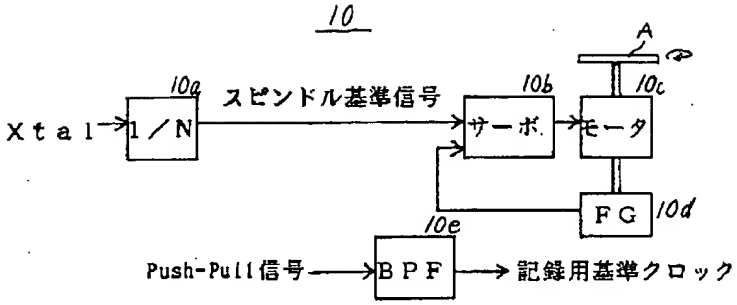
[Drawing 5]



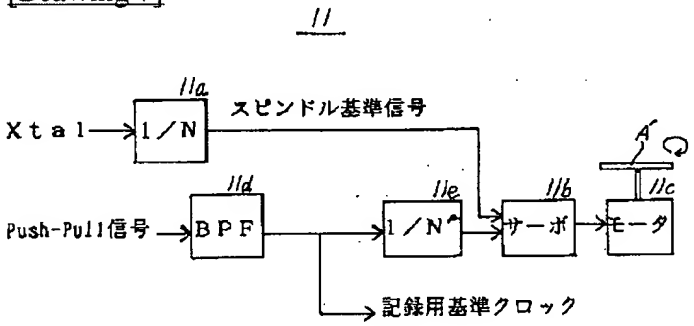
[Drawing 9]



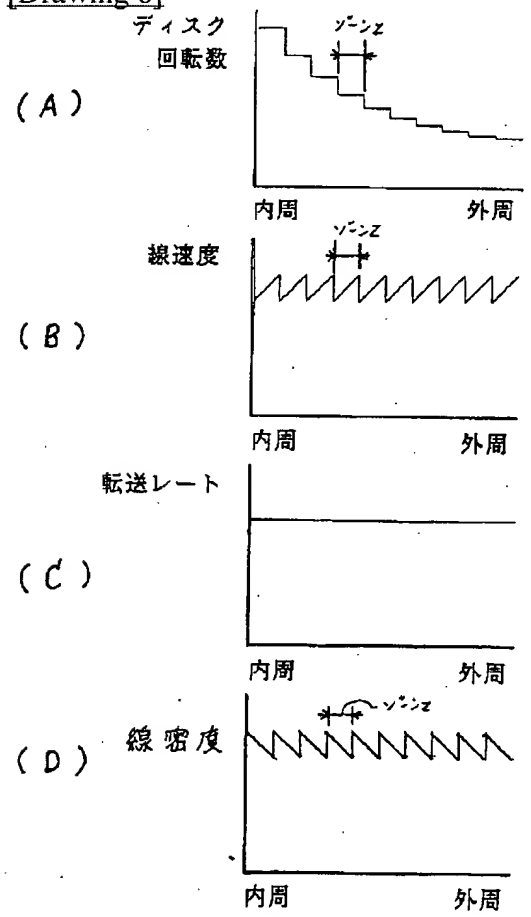
[Drawing 6]



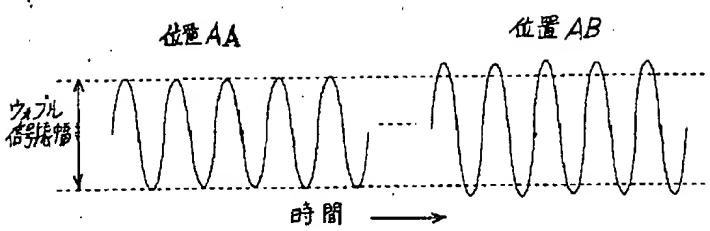
[Drawing 7]



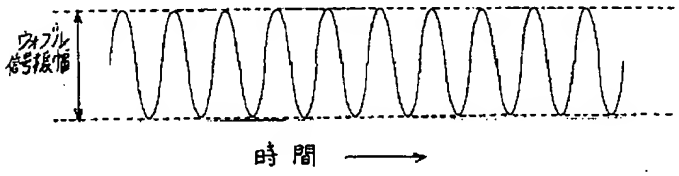
[Drawing 8]



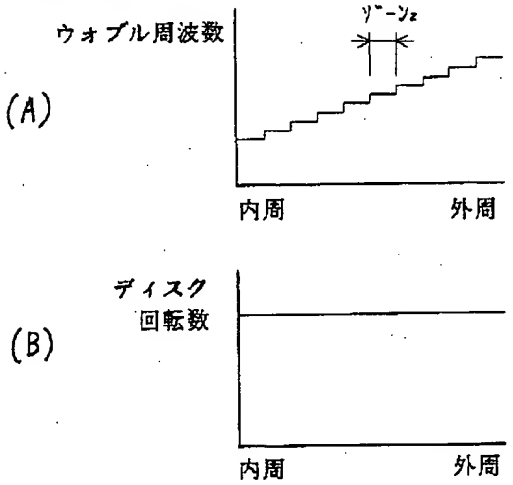
[Drawing 10]



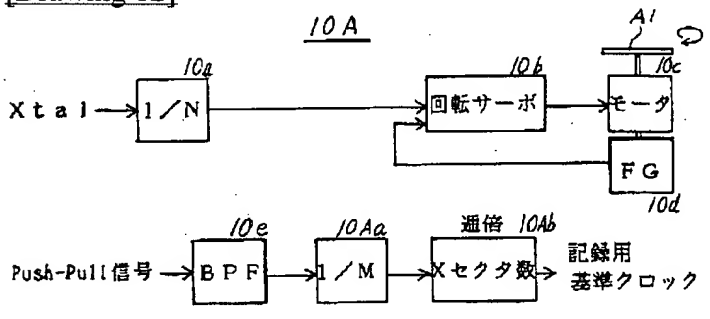
[Drawing 11]



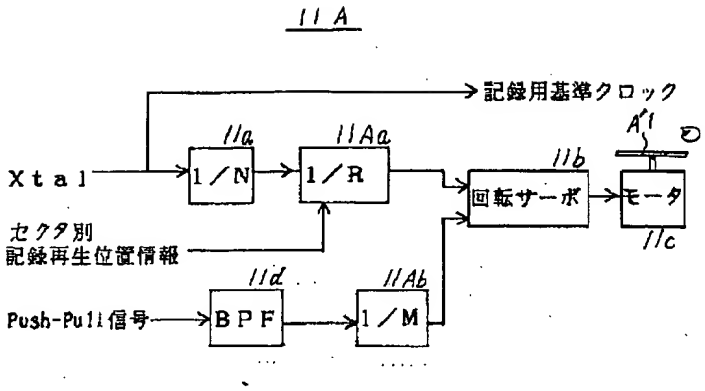
[Drawing 15]



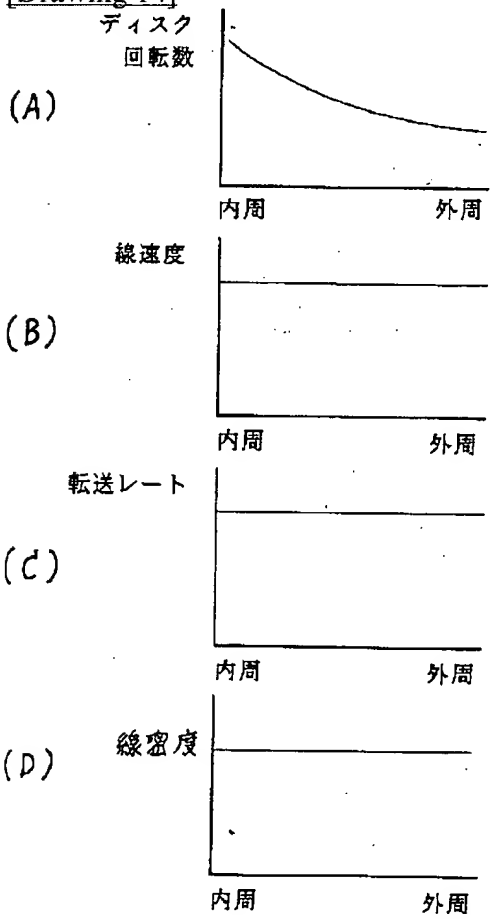
[Drawing 12]



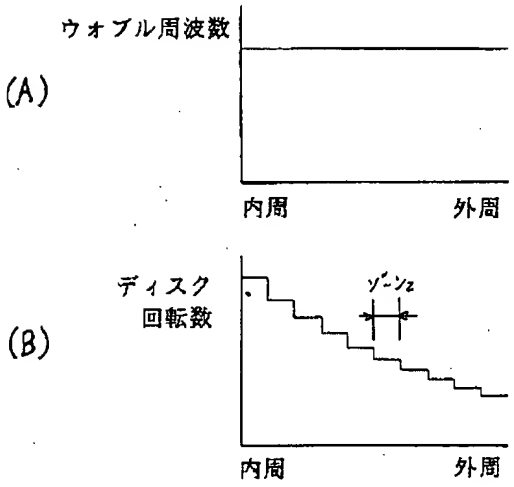
[Drawing 13]



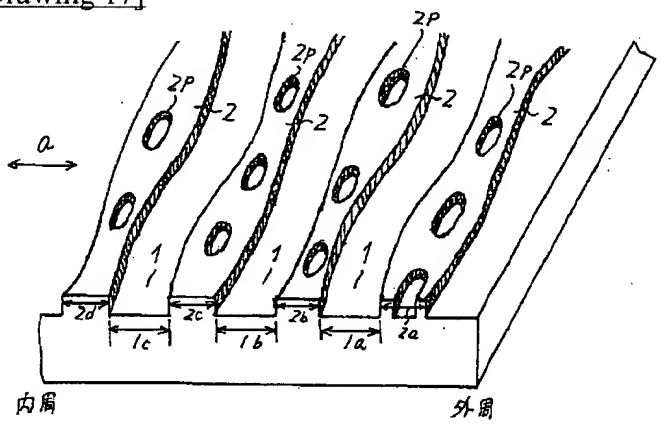
[Drawing 14]



[Drawing 16]



[Drawing 17]



[Translation done.]

* NOTICES *

CORRECTION OR AMENDMENT

[Kind of official gazette] Printing of amendment by the convention of 2 of Article 17 of Patent Law
[Section partition] The 4th partition of the 6th section
[Publication date] April 13, Heisei 13 (2001. 4.13)

[Publication No.] JP,10-134357,A
[Date of Publication] May 22, Heisei 10 (1998. 5.22)
[Annual volume number] Open patent official report 10-1344
[Application number] Japanese Patent Application No. 8-303940
[The 7th edition of International Patent Classification]

G11B 7/007
7/24 561

[FI]

G11B 7/007
7/24 561 Q

[Procedure revision]
[Filing Date] September 24, Heisei 11 (1999. 9.24)
[Procedure amendment 1]
[Document to be Amended] Specification
[Item(s) to be Amended] Claim
[Method of Amendment] Modification
[Proposed Amendment]
[Claim(s)]
[Claim 1] In the optical disk which has a spiral groove for reproducing the information which recorded information or was recorded, and comes to carry out zoning of this groove to radial,
Said groove is an optical disk with which it is characterized by a land width being abbreviation regularity over the perimeter except for a zone boundary while a variation rate is carried out crosswise [groove] according to a specific displacement frequency.
[Claim 2] In the optical disk which has a spiral groove for reproducing the information which recorded information or was recorded,
For said groove, a land width is the optical disk with which it is characterized by being abbreviation regularity over the perimeter while a variation rate is carried out crosswise [groove] according to a specific displacement frequency.
[Procedure amendment 2]
[Document to be Amended] Specification
[Item(s) to be Amended] 0013

[Method of Amendment] Modification
[Proposed Amendment]
[0013] (1) It has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded, as shown in drawing 1 - drawing 3. In optical disk A.A' to which it comes to carry out zoning of this groove 1 to radial (ZCAV or ZCLV method) said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) The optical disk with which land widths 2a-2d and -- are characterized by what is been abbreviation regularity (the land widths 2a-2d of the land 2 by which the wobble was carried out into each zone z, and the phase of -- are the same) over the perimeter of a disk except for the zone boundary sb.
[Procedure amendment 3]
[Document to be Amended] Specification
[Item(s) to be Amended] 0014
[Method of Amendment] Modification
[Proposed Amendment]
[0014] In the optical disk which has the spiral groove 1 for reproducing the information (data) which recorded information (data) or was recorded (2) Said groove 1 While a variation rate (wobble) is carried out crosswise [groove / a] according to a specific displacement frequency (single carrier frequency and single wobble frequency) Land widths 2a-2d, the optical disk with which -- is characterized by what is been abbreviation regularity (the land widths 2a-2d of the land 2 by which the wobble was carried out in the record section R, and the phase of -- are the same) over the perimeter (the record section R of a disk) of a disk.

[Translation done.]